Electronic Version
Stylesheet Version v1.1.1

Claims

[c1] 1.An electronic assembly comprising:
a first layer having a first interface surface and a plurality of cavities formed in the first interface surface;
a second layer having a second interface surface and a plurality of projections disposed at the second interface surface, wherein the plurality of projections are aligned with and disposed at the plurality of cavities; and
an electrically conductive connecting material disposed at the plurality of cavities such that the connecting material connects the plurality of projections to the respective plurality of cavities.

[c2] 2.The assembly of Claim 1, wherein:
the plurality of cavities are formed having a depth d in the first interface surface;
the first interface surface is disposed apart from the second interface surface by a gap g; and
the plurality of projections have a length h that is equal to or less than the sum of the depth d and the gap g.

[c3] 3.The assembly of Claim 1, wherein:
the plurality of projections have a width w equal to or greater than about 100 microns and equal to or less than

about 700 microns.

[c4] 4.The assembly of Claim 3, wherein:
the plurality of projections have a width w equal to about 500 microns.

[c5] 5.The assembly of Claim 3, wherein:
the pitch of the plurality of projections is equal to or greater than about 1.1 times the width w and equal to or less than about 3 times the width w.

[c6] 6.The assembly of Claim 5, wherein:
the pitch of the plurality of projections is equal to about 2 times the width w.

[c7] 7.The assembly of Claim 1, wherein:
the plurality of projections are shaped to mirror the shape of the plurality of cavities.

[c8] 8.The assembly of Claim 1, wherein:
the first layer comprises a ceramic substrate;
the second layer comprises a diode array having a plurality of backlit photodiodes in electrical communication with the plurality of projections; and
the connecting material comprises a conductive epoxy, a conductive solder, or any combination comprising at least one of the foregoing materials.

[c9] 9.The assembly of Claim 1, wherein:
the connecting material is constrained by the perimeter of each of the plurality of cavities at the first interface surface.

[c10] 10.The assembly of Claim 9, wherein adjacent projections are absent direct electrical communication.

[c11] 11.The assembly of Claim 8, wherein:
the assembly comprises a light detector for use in medical diagnostic equipment.

[c12] 12.The assembly of Claim 8, wherein:
the plurality of photodiodes are spaced on the first layer with an edge spacing equal to or less than about 100 micrometers.

[c13] 13.The assembly of Claim 12, wherein:
the plurality of photodiodes are spaced on the first layer with an edge spacing equal to or less than about 25 micrometers.

[c14] 14.The assembly of Claim 13, wherein:
the plurality of photodiodes are spaced on the first layer with an edge spacing equal to about 10 micrometers.

[c15] 15.An apparatus for assembling an electronic assembly comprising a top layer, the apparatus comprising:

a porous rigid element having a thickness and a support surface; and

a housing configured to hold the porous rigid element and to provide a positive vacuum to the porous rigid element;

wherein the applied positive vacuum results in a positive vacuum at the support surface for picking up the top layer.

[c16] 16.The apparatus of Claim 15, wherein:

the housing is disposed at all sides of the porous rigid element except the support surface.

[c17] 17.The apparatus of Claim 16, wherein:

a portion of the thickness of the porous rigid element is exposed.

[c18] 18.The apparatus of Claim 15, wherein:

the support surface of the porous rigid element has a flatness equal to or less than about 20 micrometers.

[c19] 19.The apparatus of Claim 17, wherein:

the support surface of the porous rigid element has a flatness equal to or less than about 10 micrometers.

[c20] 20.The apparatus of Claim 15, wherein:

the support surface has an overall dimension substantially matched to an overall dimension of the top layer.

[c21] 21.The apparatus of Claim 20, wherein:
the support surface has two overall dimensions substantially matched to two associated overall dimensions of the top layer.

[c22] 22.The apparatus of Claim 15, wherein:
the porous rigid element comprises a plurality of cavities having disposed therein a plurality of heater elements.

[c23] 23.The apparatus of Claim 15, wherein:
the housing comprises a vacuum port arranged to provide the positive vacuum to the porous rigid element.

[c24] 24.The apparatus of Claim 15, wherein:
the support surface and the resultant positive vacuum at the support surface are sufficient to flatten a top layer having an original flatness equal to or greater than about 50 micrometers to a final flatness equal to or less than about 20 micrometers.

[c25] 25.The apparatus of Claim 24, wherein:
the support surface and the resultant positive vacuum at the support surface are sufficient to flatten a top layer having an original flatness equal to or greater than about 100 micrometers to a final flatness equal to or less than about 10 micrometers.

[c26] 26.A method of assembling an electronic assembly, the assembly comprising a first layer having a first interface surface and a plurality of cavities formed in the first interface surface, and a second layer having a second interface surface and a plurality of projections disposed at the second interface surface, the method comprising:
positioning the first layer;
vacuum holding the second layer via an apparatus such that the first and the second interface surfaces oppose each other;
aligning the plurality of projections with the plurality of cavities;
engaging the plurality of projections with the plurality of cavities; and
sufficiently reducing the vacuum hold so as to release the second layer.

[c27] 27.The method of Claim 26, further comprising:
applying an electrically conductive connecting material to at least one of the plurality of cavities and the plurality of projections; and
subsequent to the engaging, processing the connecting material so as to adhere the plurality of projections to the plurality of cavities.

[c28] 28.The method of Claim 27, wherein the processing comprising:

heating the electrically conductive connecting material.

[c29] 29.The method of Claim 28, wherein:
the electrically conductive connecting material comprises solder; and
the heating comprises solder re-flowing.

[c30] 30.The method of Claim 28, wherein:
the electrically conductive connecting material comprises epoxy; and
the heating comprises curing.

[c31] 31.The method of Claim 27, wherein:
the sufficiently reducing the vacuum hold is subsequent to the processing the connecting material.

[c32] 32.The method of Claim 26, wherein:
the vacuum holding is performed using the apparatus of Claim 15.

[c33] 33.The electronic assembly of Claim 1 made by the method of Claim 26.

[c34] 34.The electronic assembly of Claim 33, wherein:
the assembly comprises a light detector for use in medical diagnostic equipment.